PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No. : 10/084,658 Confirmation No.: 2489

In re Application of:

Ken FUKUTA et al. Group Art Unit: 1731

Filed : February 28, 2002 Examiner : Christopher A. Fiorilla

For: METHOD OF MANUFACTURING CERAMIC BODY

DECLARATION UNDER 37 C.F.R. 1.132

I, Akio ENOMOTO, declare that:

(i) I am a joint inventor of the invention claimed herein;

(ii) I am familiar with the prosecution history of the case including the Office Action mailed December 16, 2003 where claims 1 to 4 and 6 were finally rejected under 35 USC 102 as anticipated by Ogawa et al. U.S. P. 4,559,193;

(iii) the following tests reported in (iv) were carried out under my supervision and direction to establish unexpected and patentable results achieved when carrying out the method of finally rejected claim 2;

(iv) (a) Experimental objects

In the following methods, a ceramic honeycomb structural body having a diameter of 300 mm, a cell density of 300 cells/inch^2 and a total number of cells of 30,000 cells, where the number of cells to be pierced was 15,000 cells, and KEYENCE Corporation laser markers were used,

(iv) (b) No correction method (Prior Art)

The piercing operation was performed without correcting cell positions. That is, the cell positions were determined in such a manner that only a center cell position was detected by means of the image processing apparatus and the cell positions other than the center cell position were determined by using the predetermined cell pitch from the center cell position. The piercing operation was then performed one-by-one for every 45 mm × 45 mm region. In this

method, the image pick-up operation was performed once for the region including the center of the cells.

(iv) (c) Sub-block correction method (Present Invention)

The piercing operation was performed respectively for sub-blocks obtained by dividing the cells at the end surface into sub regions. The cell end surface was divided into 21 mm × 21 mm (14 cells × 14 cells) sub blocks. In each sub-block, a center cell position was detected and an average cell pitch of the sub-block was determined by means of the image processing apparatus. Then, data of all the cell positions on the basis of the average cell pitch in the same sub-block were transferred to the laser marker by one data transmitting operation and the piercing operation for the sub-block was performed. This piercing operation was performed for all the sub-blocks.

(iv) (d) All cell correction method

The piercing operation was performed for all the cells one by one after correcting the cell positions one by one. That is, the cell positions were determined respectively one by one by using its center of gravity by means of the image processing apparatus. Data of one cell was then transferred to the laser marker, so that the piercing operation for this one cell was performed. This operation was repeated for all the cells to be pierced. In this method, the image pick-up operation was performed for all the cells.

(iv) (e) Experimental results

In the above three methods, time (1) for work detaching operation, time (2) for image picking-up operation, and time (3) for data correcting, data transmitting and piercing operations were measured. The results are shown in the following Table.

Table 1

	Time (1) (sec)	Time (2) (sec)	Time (3) (sec)	Total (sec)
No correction method	20	5	182	207
Sub-block correction method	20	120	309	449
All cell correction method	20	120	1984	2124

(iv) (f) In the no correction method, the total time necessary for piercing is small, but the accurate cell position detection and the accurate piercing operation are not performed because only the center cell position is determined by means of the image processing apparatus. In the all cell correction method, the accurate cell position detection and the accurate piercing operation are performed, but the total time necessary for piercing is very large because the data transfer operation and the cell piercing operation were performed one by one. In contrast, in the sub-block correction method of the invention, the accurate cell position detection and the accurate piercing operation are performed; moreover the total time necessary for piercing is not so large. This improvement is accomplished because the data transfer and the data piercing operation are performed for every sub-block.

(iv) (g) In the above method, the data transfer operation takes a long time because a long initial agreement such as a hand shake operation and so on is necessary before the data transfer; and

(v) all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

June 9, 2004
Date

Akio Enomato
Akio ENOMOTO